

CLAIMS

1. A passive mixer (100; 300) for converting a first signal having a first frequency to a second signal having a second frequency, comprising:

mixing means (110; 310, 320, 330, 340), a first terminal (120), a second terminal (130) and a third terminal (140), for providing the second signal by mixing a third signal having a third frequency provided as input at said second terminal and the first signal provided as input at either the first or the third terminal;

characterized by
a feedback circuit (150; 311, 321, 331, 341) operatively connected to said third (140) and said second terminal (130).

2. The mixer according to claim 1, **characterized in** that the feedback circuit (150; 311, 321, 331, 341) is a bootstrap circuit.

20

3. The mixer according to claim 1 or 2, **characterized in** that the feedback circuit (150; 311, 321, 331, 341) comprises a low pass filter (160).

25 4. The mixer according to claim 3, **characterized in** that the filter (160) comprises a capacitor (162, 313, 323, 333, 343) connected between said second terminal and said mixing means, and a resistor (161; 312, 322, 332, 342) connected between said third terminal and the connection 30 between said capacitor and said mixing means.

5. The mixer according to any of the previous claims, **characterized in** that said mixing means is a voltage controlled switch.

35

6. The mixer according to any of the previous claims, characterized in that said mixing means comprises a FET transistor switch (111; 310, 320, 330, 340) having either its drain or source operatively connected to said first terminal, its gate operatively connected to said second terminal, and either its source or drain operatively connected to said third terminal.

7. The mixer according to claim 6, characterized in that said FET transistor is a NMOS transistor.

8. The mixer according to any of the previous claims, characterized in that the mixer is a balanced mixer comprising an even number of mixing means.

9. Use of the mixer according to any of the claims 1-8 in electronic equipment (1, 30).

10. Use according to claim 9, wherein the electronic equipment is a portable communication equipment (1, 30) having a supply voltage of less than 2V.

11. Use according to claim 9 or 10, wherein the electronic equipment is a mobile radio terminal, a mobile telephone (1), a pager, or a communicator.

12. Use according to claim 9, wherein the electronic equipment is adapted to operate in a wireless local area network.

13. Use according to claim 9 or 10, wherein the mixer is used in a communication equipment (30) adapted to provide short-range supplementary communication according to Bleutooth® technology.

14. Apparatus comprising the mixer (300) according to any of the claims 1-8, said mixer is connected to a low noise amplifier (LNA) (400) comprising:

a first input terminal (401) connected to a first capacitor (410) being connected to a first amplifying means (411), said first amplifying means is connected to a first output terminal (430) and to voltage supply via a first inductor (412);

a second input terminal (402) connected to a second capacitor (420) being connected to a second amplifying means (421), said second amplifying means is connected to a second output terminal (431) and to voltage supply via an second inductor (422); and

wherein the first and second amplifying means (411, 421) are referenced to grounding means, and the first and second output terminals (430, 431) are referenced to said grounding means via third and fourth inductors (432, 433).